NASA Glenn Success Stories

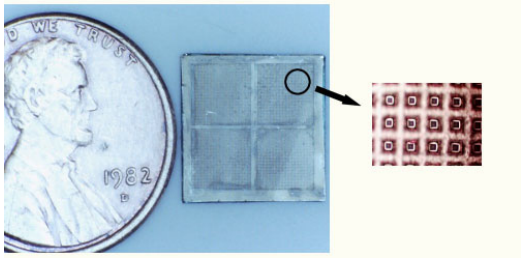
Hot Computer Chips, NASA's Cool Technology

TECHNOLOGY

NASA Glenn has combined its expertise in microelectromechanical systems (MEMS) and Stirling cycle thermodynamic engines in developing the innovative MEMS Stirling cooler technology.

COMMERCIAL APPLICATION

In the electronics industry, computer chips are a hot technology—literally. Let the chips run hot, and they run neither fast nor long. NASA Glenn has developed a miniaturized refrigeration cycle that promises to efficiently cool those chips.



The heart of a MEMS Stirling Cooler: the regenerator.

GLITeC and the NASA Illinois Commercialization Center (NICC) found an ideal commercialization partner in Polar Thermal Technologies, Inc., a two-year-old start-up company that specializes in dissipating heat from super-fast computer chips. After receiving an NICC Award, Polar purchased important capital equipment. This equipment, along with the company's unique fabrication materials and capabilities, gave Polar the technical ability to substantially improve the potential performance of the cooling device.

SOCIAL/ECONOMIC BENEFIT

Working with NASA has paid off. In developing the first working prototype MEMS Stirling cooler, Polar has generated valuable new IP, applied for two new patents, licensed one patent from NASA, and gained key capabilities in leak testing, thermal performance testing, and plating. This has given Stephan Stelter, Polar's CEO, great confidence in his business: "NICC's intimate knowledge of our company's technology capabilities, paired with their understanding of relevant cutting-edge technologies developed at NASA Glenn, have significantly enhanced our business."

NASA APPLICATIONS

NASA Glenn has a long history of developing increasingly efficient engine-based thermodynamic cycles. This technology has many potential NASA (and public) fields of application, including sensor cooling, avionics, spacecraft components, emerging microsystems, telecommunications, and biotechnology.

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